



## P-Channel 30-V (D-S) MOSFET



Available

### PRODUCT SUMMARY

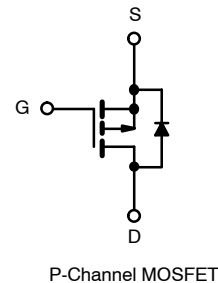
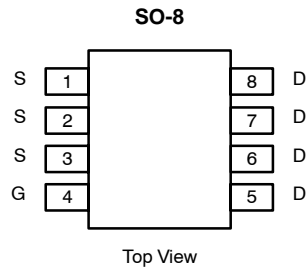
$V_{DS}$ (V)	$r_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)
-30	0.020 @ $V_{GS} = -10$ V	-9.1
	0.035 @ $V_{GS} = -4.5$ V	-6.9

### FEATURES

- TrenchFET® Power MOSFET
- Advanced High Cell Density Process
- Lead (Pb)-Free Version is RoHS Compliant

### APPLICATIONS

- Load Switches
- Battery Switch



Ordering Information: Si4435BDY-T1  
Si4435BDY-T1—E3 (Lead (Pb)-Free)

### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

Parameter		Symbol	10 secs	Steady State	Unit
Drain-Source Voltage		V <sub>DS</sub>	−30		V
Gate-Source Voltage		V <sub>GS</sub>	± 20		
Continuous Drain Current (T <sub>J</sub> = 150°C) <sup>a</sup>	T <sub>A</sub> = 25°C	I <sub>D</sub>	−9.1	−7	A
	T <sub>A</sub> = 70°C		−7.3	−5.6	
Pulsed Drain Current		I <sub>DM</sub>	−50		
continuous Source Current (Diode Conduction) <sup>a</sup>		I <sub>S</sub>	−2.1	−1.25	
Maximum Power Dissipation <sup>a</sup>	T <sub>A</sub> = 25°C	P <sub>D</sub>	2.5	1.5	W
	T <sub>A</sub> = 70°C		1.6	0.9	
Operating Junction and Storage Temperature Range		T <sub>J</sub> , T <sub>stg</sub>	−55 to 150		°C

### THERMAL RESISTANCE RATINGS

Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient <sup>a</sup>	$t \leq 10$ sec	$R_{thJA}$	40	50	$^\circ\text{C/W}$
	Steady State		70	85	
Maximum Junction-to-Foot (Drain)	Steady State	$R_{thJF}$	18	22	

#### Notes

a. Surface Mounted on 1" x 1" FR4 Board.

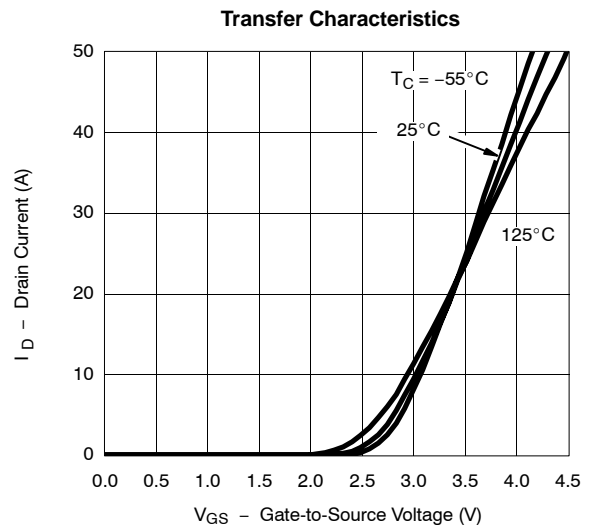
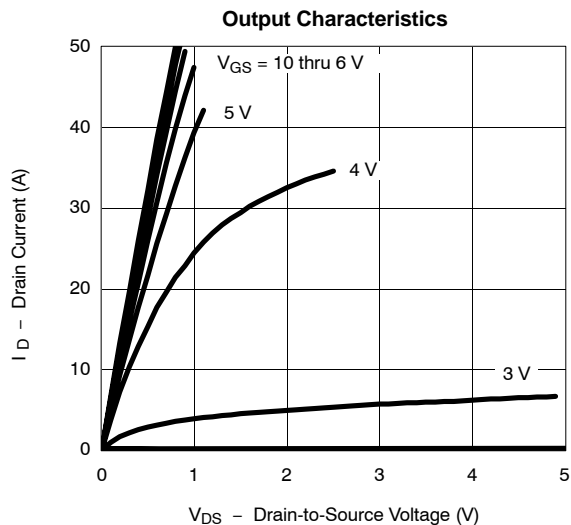
**SPECIFICATIONS ( $T_J = 25^\circ\text{C}$  UNLESS OTHERWISE NOTED)**

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
<b>Static</b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\ \mu\text{A}$	-1		-3	V
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0\ \text{V}, V_{GS} = \pm 20\ \text{V}$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -30\ \text{V}, V_{GS} = 0\ \text{V}$			-1	$\mu\text{A}$
		$V_{DS} = -30\ \text{V}, V_{GS} = 0\ \text{V}, T_J = 55^\circ\text{C}$			-25	
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} = -5\ \text{V}, V_{GS} = -10\ \text{V}$	-40			A
Drain-Source On-State Resistance <sup>a</sup>	$r_{DS(on)}$	$V_{GS} = -10\ \text{V}, I_D = -9.1\ \text{A}$		0.015	0.020	$\Omega$
		$V_{GS} = -4.5\ \text{V}, I_D = -6.9\ \text{A}$		0.025	0.035	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = -10\ \text{V}, I_D = -9.1\ \text{A}$		24		S
Diode Forward Voltage <sup>a</sup>	$V_{SD}$	$I_S = -2.1\ \text{A}, V_{GS} = 0\ \text{V}$		-0.8	-1.2	V
<b>Dynamic<sup>b</sup></b>						
Total Gate Charge	$Q_g$	$V_{DS} = -15\ \text{V}, V_{GS} = -10\ \text{V}, I_D = -9.1\ \text{A}$		33	70	nC
Gate-Source Charge	$Q_{gs}$			5.8		
Gate-Drain Charge	$Q_{gd}$			8.6		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -15\ \text{V}, R_L = 15\ \Omega$ $I_D \cong -1\ \text{A}, V_{GEN} = -10\ \text{V}, R_G = 6\ \Omega$		10	15	ns
Rise Time	$t_r$			15	25	
Turn-Off Delay Time	$t_{d(off)}$			110	170	
Fall Time	$t_f$			70	110	
Source-Drain Reverse Recovery Time	$t_{rr}$	$I_F = -2.1\ \text{A}, di/dt = 100\ \text{A}/\mu\text{s}$		60	90	

**Notes**

- a. Pulse test; pulse width  $\leq 300\ \mu\text{s}$ , duty cycle  $\leq 2\%$ .  
b. Guaranteed by design, not subject to production testing.

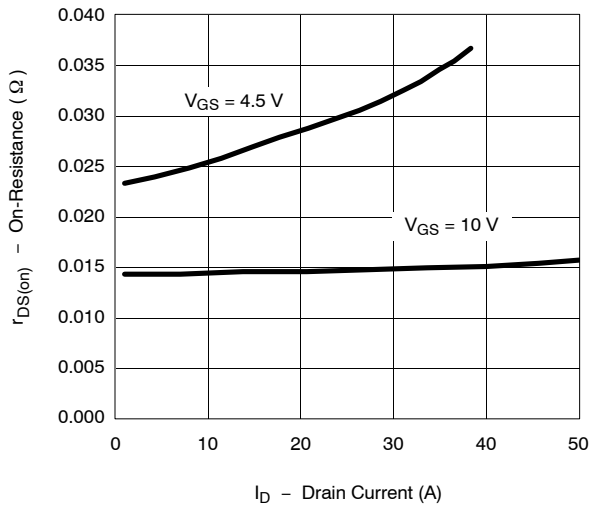
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

**TYPICAL CHARACTERISTICS ( $25^\circ\text{C}$  UNLESS NOTED)**

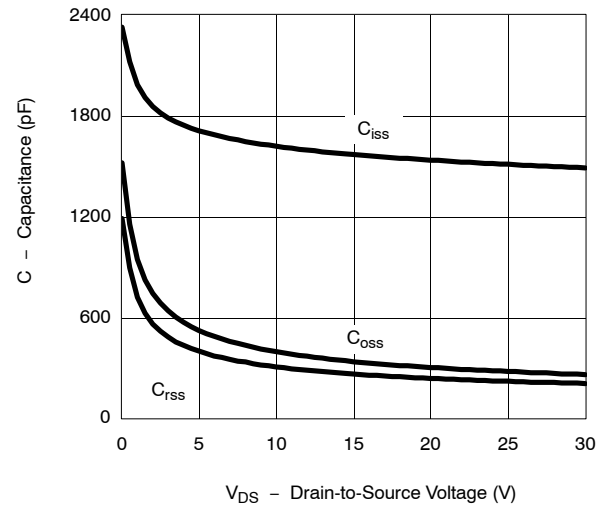


**TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)**

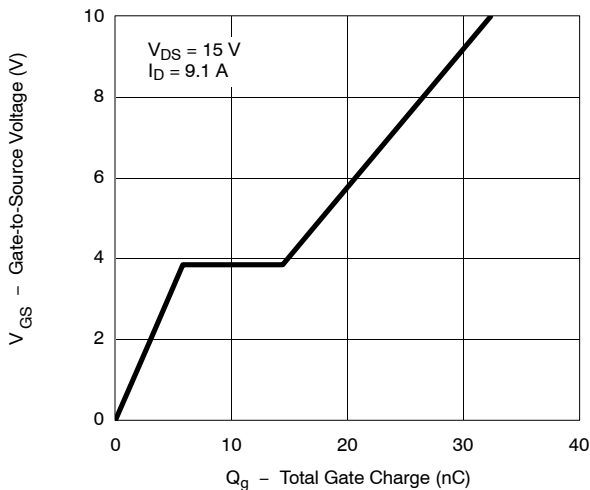
**On-Resistance vs. Drain Current**



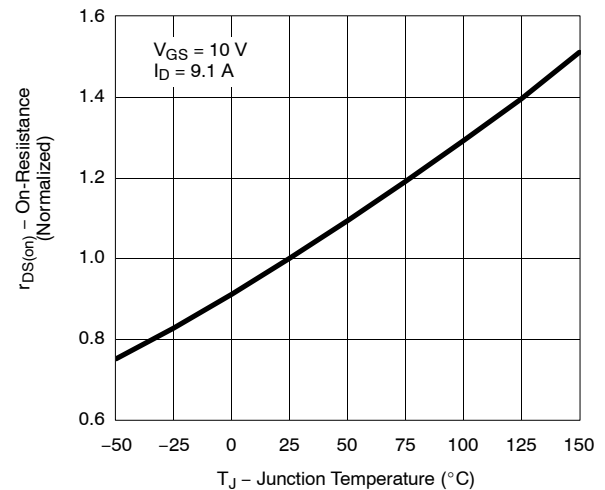
**Capacitance**



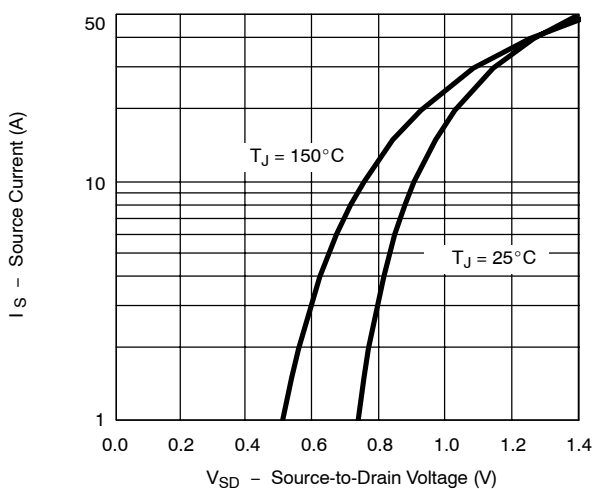
**Gate Charge**



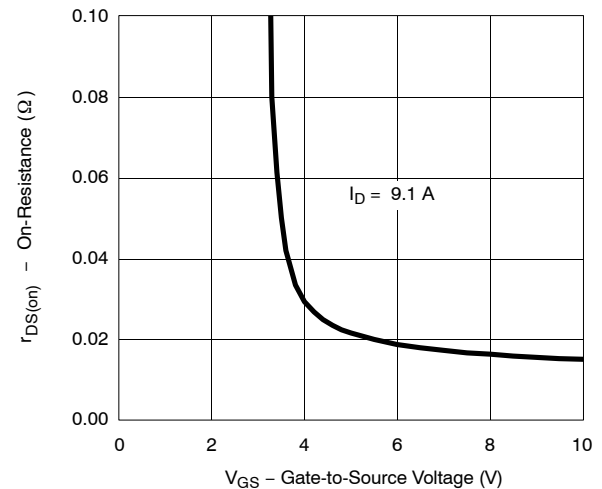
**On-Resistance vs. Junction Temperature**



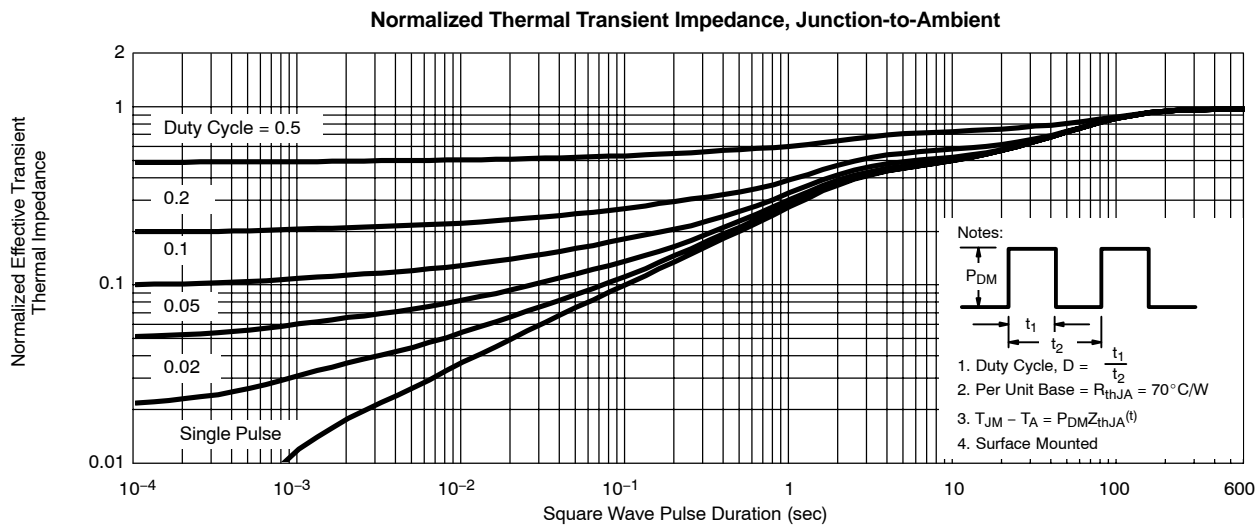
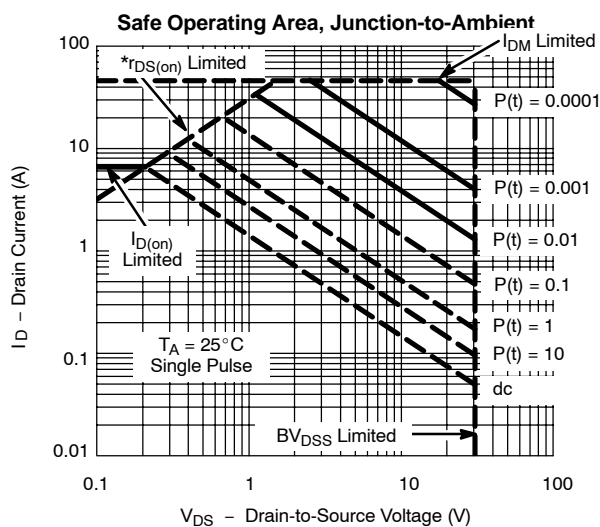
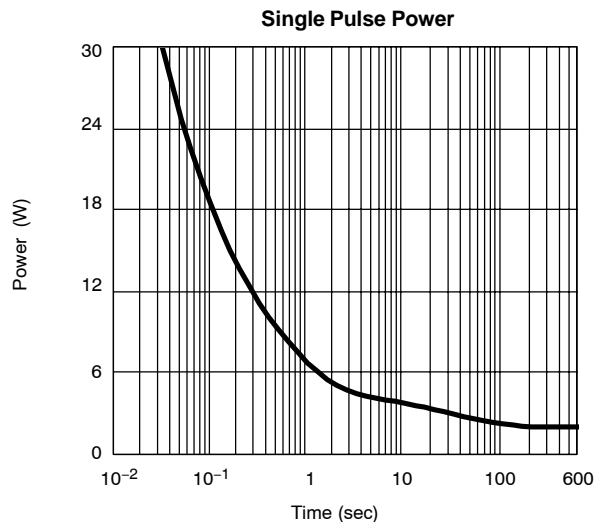
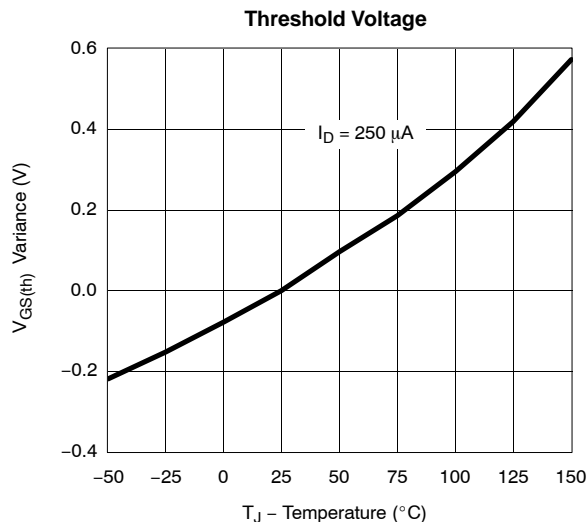
**Source-Drain Diode Forward Voltage**



**On-Resistance vs. Gate-to-Source Voltage**

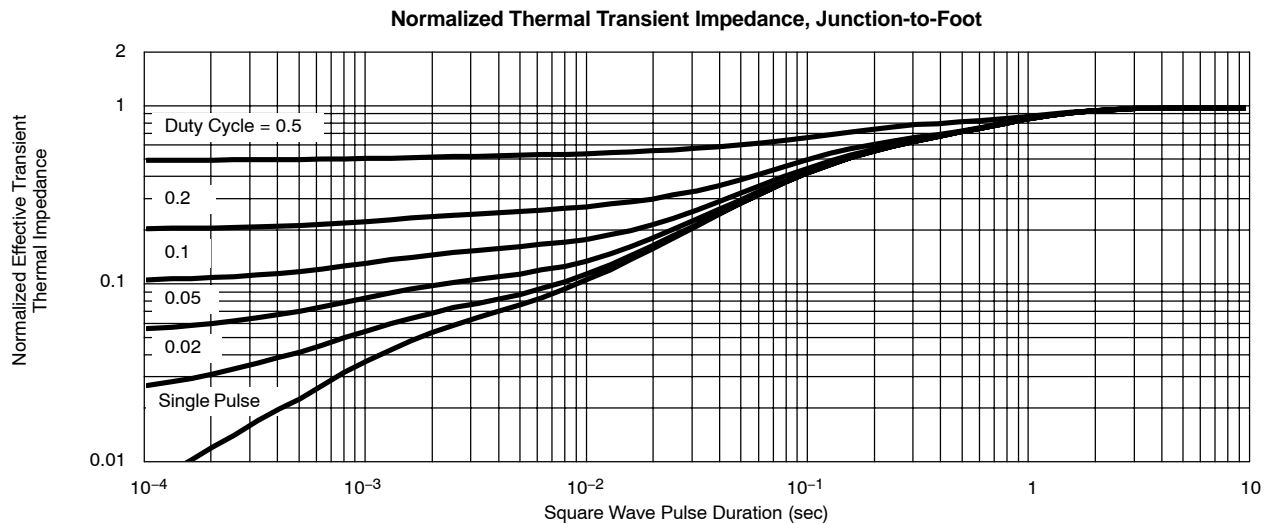


**TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)**





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